IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. :	10/622,881	Conf. No.	2745
Applicant :	Sunil G. Warrier et al.		
Filed :	07/18/2003		
TC/A.U. :	1746		
Examiner :	Robert W. Hodge		
Docket No.:	02-510		
Cust. No. :	34704		

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

Appeal Brief

Dear Sir:

This brief is submitted following a Notice of Appeal filed on July 9, 2007, and is accompanied by a request for extension of time extending the period for filing through and including January 9, 2008.

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(i) Real party in interest. The real party in interest for this application is the assignee of record, which is UTC Fuel Cells, L.L.C. In this regard, the assignee has undergone a name change to UTC Power Corporation, and a name change document will be recorded in due course.

(ii) Related appeals and interferences. There are no known related appeals or interferences.

(iii) Status of Claims.

Claims 1-3, 6, 7, 9-12 and 24-26 are rejected and on appeal.

Claims 4, 22 and 23 are cancelled.

Claim 5 is allowed.

Claim 8 is objected to.

Claims 13-21 are withdrawn.

(iv) Status of Amendments. A response to the final rejection was filed on July 9, 2007. This response was acted upon by the Examiner, but contained no claim amendments so entry was not required.

(v) Summary of claimed subject matter.

Independent claims 1 and 24 are on appeal. The text of these claims is produced below in the Claims Appendix.

Claim 1 calls for a seal assembly (See Figure 1 generally) for a solid oxide fuel cell stack, comprising at least two fuel cells 12, each comprising an electrolyte 16 having a cathode layer 18 on one side and an anode layer 20 on the other side (See specification page 5, lines 22-25), and at least one bipolar plate 14 between the at least two fuel cells (See specification page 5, lines 26-31), the at least two fuel cells and the bipolar plate collectively defining at least two fuel cell components having opposed surfaces (See specification page 6, lines 14-20); and a continuous fiber tow (See specification page 5, lines 12-14) wrapped into a closed-loop structure (See specification page 7, lines 4-6) forming a substantially gas impermeable seal between said opposed surfaces.

Claim 24 calls for a seal assembly (See Figure 1 generally) for a solid oxide fuel cell stack, comprising at least two fuel cells 12 each comprising an electrolyte 16 having a cathode layer 18 on one side and an anode layer 20 on the other side (See specification page 5, lines 22-25), and at least one bipolar plate 14 between the at least two fuel cells (See specification page 5, lines 26-31), the at least two fuel cells and the bipolar plate collectively defining at least two fuel cell components having opposed surfaces (See specification page 6, lines 14-20); a continuous fiber tow (See specification page 5, lines 12-14) wrapped into a closed-loop structure (See specification page 7, lines 4-6) forming a substantially gas impermeable seal between said opposed surfaces; and a compression stop 50 disposed between said opposed surfaces of said fuel cell stack components (See specification page 6, lines 3-7).

(vi) Grounds of rejection to be reviewed on appeal.

The first ground of rejection on appeal is whether claims 1 and 24 are obvious over a combination of US 6,074,771 to Cubukcu et al. (hereafter "Cubukcu") in view of US 6,139,810 to Gottzmann (hereafter "Gottzmann").

A second ground of rejection is whether claims 25 and 26 are obvious based upon this same combination.

(vii) Argument.

In the final office action from which appeal is taken, the Examiner rejected claims 1 and 24-26 as obvious over a combination of Cubukcu and Gottzmann.

Independent claim 1 calls for a bipolar plate between two fuel cells, wherein the bipolar plate and at least one of the fuel cells define opposed surfaces. Claim 1 further requires a continuous fiber tow in a closed loop structure forming a substantially gas impermeable seal between the opposed surfaces.

Cubukcu discloses a ceramic composite electrolyte device, and discloses components such as bipolar foil member 50 and photolithographic member 60 which are sealed to each other by metal to metal welds. The Examiner concedes that Cubukcu does not disclose the seal of claim 1, but asserts that Gottzmann teaches this subject matter. In response to arguments submitted previously, the Examiner focuses on an explanation of the bipolar foil of Cubukcu. The thrust of the argument against this rejection is that Cubukcu does not disclose or suggest a seal in the location of the presently claimed seal, and that the secondary references do not cure this deficiency.

Cubukcu discusses sealing only in connection with sealing "arm"12 so that it can be used as both an inlet and an outlet. This is done with foil 50 (Fig. 13A). This seal has nothing to do with the seal of the present invention. Further, even if the seal were construed to meet the seal of the present invention, it is not at all a continuous fiber tow as claimed. Cubukcu is significantly deficient as compared to claim 1.

Gottzmann, in addition to being non-analogous art and teaching a radically different structure than that which is claimed, also teaches no kind of seal which would be compatible with the seal that is necessary for Cubukcu to function. Cubukcu, as mentioned

above, teaches a flat foil 50 to divide arm 12 into both an inlet and an outlet. Clearly this would be impossible with a seal such as that disclosed in Gottzmann. To try to piece the teachings of Kubukcu and Gottzmann together results in an inoperative structure.

It is also noted that Kubukcu appears to the undersigned to be totally silent on the point of creating a seal between adjacent fuel cells. The Examiner speculates that such a seal would be necessary, but there is no teaching in either of Kubukcu or Gottzmann that has any relation to such a seal.

Based upon the foregoing, it is clear that the rejection is improper and should be reversed.

In addition to the above, it is also noted that Gottzmann does not disclose a solid oxide fuel cell stack with at least two fuel cell components and a continuous fiber tow wrapped into a closed-loop structure forming a substantially gas impermeable seal between opposed surfaces of the components. Rather, in a completely different environment, Gottzmann discloses an O-ring 50 which is between tube sheet 21, outer wall 54 of reaction tube 34, and a sleeve flange 58. None of these structures remotely resembles the structures which define the opposed surfaces in claim 1. Further, none of these structures or teachings in Gottzmann related thereto would lead a person skilled in the art to believe that the O-ring 50 of Gottzmann could be substituted for the metal to metal weld called for in Kubukcu. The Gottzmann disclosure is a very different overall device, with an O-ring seal in a very different type of location. It is submitted that there is clearly no proper motivation to select the O-ring from Gottzmann and insert it into the device of Kubukcu in place of the welding clearly called for therein. This combination of prior art teachings is not logical, and would not be done by a person of skill in the art, it is

submitted, in light of the clear incompatibility of the seal of Kubukcu and Gottzmann.

Independent claim 24 calls for similar subject matter and further adds a compression stop disposed between the two opposed surfaces. Thus, the above rationale supports claim 24 as wel, In addition, the Examiner states that Gottzmann teaches a compression stop extending from one of the fuel cell components to another fuel cell component and that this compression stop is frame like in shape and has a groove to hold the seal member. The Examiner refers to Figures 1-4 and column 7, line 8 to column 10, line 35, of Gottzmann.

First, it is pointed out that the Gottzmann device is not at all a fuel cell and, therefore, that it is not possible for Gottzmann to have fuel cell components between which a compression stop could be located.

Second, if the Examiner considers the recess illustrated in Figure 4 of Gottzmann to meet the limitations of claim 24, it should be appreciated that this structure is completely incompatible with incorporation into Kubukcu. The members joined in Kubukcu are metal foils which are welded together. A metal foil would present difficulty to a person of skill in the art in trying to incorporate a recess such as that shown in Figure 4. A material far more rigid than the foil of Kubukcu would be needed. Further, Gottzmann positioned the O-ring between circular concentric surfaces in Figure 4, which do not at all resemble the surfaces called for by claim 24. In short, it is submitted that there is no suggestion to combine Kubukcu with Gottzmann, no teaching that indicates how a person skilled in the art should do such combining, and a clear inconsistency between the structures of Kubukcu and Gottzmann which leads to the inescapable conclusion that a person of skill in the art would not consider Gottzmann as teaching

anything pertinent to the claims of the present application or the teachings of Kubukcu.

Reversal of the rejection of claim 24 is therefore earnestly solicited.

Dependent claims 2, 3, and 6-7 and 9-12 all depend from claim 1 and should be allowed based upon this dependency and also in their own right. Dependent claims 25-26 depend from claim 24 and should be allowed based upon this dependency as well.

In the second ground of rejection to be considered, claims 25 and 26 call for a frame, and for the opposed surfaces to be substantially planar with the compression stop extending from one of the substantially planar surfaces. Neither of Kubukcu nor Gottzmann discloses the frame. Further, positioning of the compression stop between two substantially planar surfaces more clearly highlights the incompatibility of the teachings of Kubukcu and Gottzmann, and is yet another feature which must be totally ignored from Gottzmann in order to arrive at the subject matter of claim 26.

(viii) Claims Appendix.

1. A seal assembly for a solid oxide fuel cell stack, comprising:

at least two fuel cells each comprising an electrolyte having a cathode layer on one side and an anode layer on the other side, and at least one bipolar plate between the at least two fuel cells, the at least two fuel cells and the bipolar plate collectively defining at least two fuel cell components having opposed surfaces; and

a continuous fiber tow wrapped into a closed-loop structure forming a substantially gas impermeable seal between said opposed surfaces.

2. The apparatus according to claim 1, wherein said seal comprises a stable oxide ceramic.

3. The apparatus according to claim 1, wherein said seal comprises at least one material selected from the group consisting of alumina, magnesia, zirconia, mullite, yttrium aluminum garnate, magnesium silicate and combinations thereof.

4. (canceled)

5. (Allowed and not on appeal) A seal assembly for a solid oxide fuel cell stack, comprising:

at least two fuel cell components having opposed surfaces; and

a seal member disposed between said surfaces, wherein said seal member comprises one or more substantially continuous fibers, and wherein said fibers are impregnated with Ag_2O.

6. The apparatus of claim 1, wherein said seal is impregnated with at least one metal selected from the group consisting of Ni, Cr, Ag, Cu, Fe, Al and combinations thereof.

7. The apparatus of claim 1, wherein said seal is impregnated with at least one material selected from the group consisting of alumina, zirconia, yttria aluminum garnate, magnesium silicate and combinations thereof.

8. (Allowable and not on appeal) The apparatus of claim 1, wherein said seal is impregnated with Ag_2O.

9. The apparatus of claim 1, wherein said seal comprises at least a first fiber in a substantially concentric relationship with a second fiber.

10. The apparatus of claim 9, wherein said at least two fuel cell components comprise a separator plate and a fuel cell with said seal disposed therebetween.

11. The apparatus of claim 1, further comprising a compression stop extending from at least one of said fuel cell components toward the other of said fuel cell components and defining thereon at least one of said opposed surfaces and having a groove for receiving said seal member.

12. The apparatus of claim 11, wherein said seal has a height and said groove has a depth, and wherein said height is greater than said depth whereby said seal in said groove can be compressed between said opposed surfaces.

13. (withdrawn) A seal member for a solid oxide fuel cell stack, comprising one or more substantially continuous fibers.

14. (withdrawn) The seal member of claim 13, wherein said seal is defined by multiple loops of said substantially continuous fibers.

15. (withdrawn) The seal member of claim 14, wherein said at least one substantially continuous fiber defines said multiple loops, and wherein end portions of said substantially continuous fibers are wrapped around said multiple loops.

16. (withdrawn) The seal member according to claim 13, wherein at least one of said substantially continuous fibers comprises a stable oxide ceramic.

17. (withdrawn) The seal member according to claim 13, wherein at least one of said substantially continuous fibers comprises a material selected from the group consisting of alumina, zirconia, yttria aluminum garnate, magnesium silicate and combinations thereof.

18. (withdrawn) The seal member according to claim 13, wherein at least one of said substantially continuous fibers comprises an elongate compressible member having a structure selected from the

group consisting of tows, yarns, woven fibers and combinations thereof.

19. (withdrawn) The seal member according to claim 13, wherein said seal member is impregnated with a plurality of particles.

20. (withdrawn) The seal member according to claim 19, wherein said particles comprise at least one metal selected from the group consisting of Ni, Cr, Ag, Cu, Fe, Al and combinations thereof.

21. (withdrawn) The seal member according to claim 13, wherein said fibers are impregnated with Ag_2O.

22. (canceled)

23. (canceled)

24. A seal assembly for a solid oxide fuel cell stack, comprising:

at least two fuel cells each comprising an electrolyte having a cathode layer on one side and an anode layer on the other side, and at least one bipolar plate between the at least two fuel cells, the at least two fuel cells and the bipolar plate collectively defining at least two fuel cell components having opposed surfaces;

a continuous fiber tow wrapped into a closed-loop structure forming a substantially gas impermeable seal between said opposed surfaces; and

a compression stop disposed between said opposed surfaces of said fuel cell stack components.

25. The apparatus of claim 24, further comprising a frame situated between said opposed surfaces, wherein said frame is located adjacent one opposed surface, and wherein said compression stop is disposed on said frame.

26. The apparatus of claim 24, wherein said opposed surfaces comprise substantially planar surfaces, and wherein said compression stop extends from one of said substantially planar surfaces toward the other of said substantially planar surfaces.

(ix) Evidence appendix - None

(x) Related proceedings appendix - None

(xi) Fees authorization and signature.

This paper is accompanied by authorization for a deposit account to pay the brief filing fee and the fee for an extension of time. It is believed that no other fee is due in connection with this paper. If any such fee is due, please charge same to Deposit Account 02-0184.

Respectfully submitted,
S. Warrier et al.

By /george a. coury/
George A. Coury
BACHMAN & LaPOINTE, P.C.
Reg. No. 34,309
Attorney for Applicants

Tel: (203)777-6628 ext. 113
Fax: (203)865-0297
docket@bachlap.com

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